4.9.2 Proposed Commission Rule Changes

94.71 Emission and bandwidth limitations.

(b) The maximum bandwidth which will be authorized per frequency assigned is set out in the table which follows. Regardless of the maximum authorized bandwidth specified for each frequency band, the Commission reserves the right to issue a license for less than the maximum bandwidth if it appears that a lesser bandwidth would be sufficient to support an applicant's intended communications.

Frequency Band (MHz)	Maximum authorized bandwidth
928-929	12.5, 25 kHz
932-932.5, 941-941.5	12.5 kHz
932.5-935, 941.5-944	12.5, 25, 50, 100, 200 kHz
952-960	12.5, 25, 50, 100, 200 kHz
1850-1990	5 or 10 MHz
2130-2150	800 or 1600 kHz
2150-2160	10 MHz
2180-2200	800 or 1800 kHz
2450-2483.5	625 kHz
2483.5-2500	800 kHz
2650-2680	6 MHz
2686.9375-2688.9375	125 kHz
3,600-3,700	*10 MHz*
3,700-4200	*20 MHz*
5,925-6,425	*30 MHz*
6425-6525	25 MHz
6525-6875	*10 MHz*
10,550-10,680	5 MHz
10,700-11,700	*30 MHz*
12,200 - 12,700	10 or 20
13,200 - 13,250	25
17,700 - 18,140	80
18,140 - 18,142	2
18,142 - 18,580	6
18,580 - 18,820	20
18,920 - 19,160	20
19,160 - 19,260	10
19,260 - 19,700	80
21,200 - 23,600	up to 100 MHz
31,000 - 31,300	25 or 50 MHz
38,600 - 40,000 MHz	up to 50 MHz
Bands above 40,000 MHz	*To be specified*

4.10 Power limitations

Part 94 must be updated to include the proposed bands.

4.10.1 Current Commission Rules

94.73 Power limitations.

(a) On any authorized frequency, the average power delivered to an antenna in this service shall be the minimum amount of power necessary to carry out the communications desired. Application of this principle shall include, but not be limited to, requiring a licensee who replaces one or more of his antennas with larger antennas to reduce his antenna input power by an amount appropriate to compensate for the increased primary lobe gain of the replacement antenna(s). In no event shall the average equivalent isotropically radiated power (EIRP), as referenced to an isotropic radiator, exceed the values specified below. Further, the output power of a transmitter on any authorized frequency in this service shall not exceed the following.

Frequency band (MHz)	Maximum allowable transmitter power		Maximum allowable EIRP	
	Fixed (W)	Mobile (W)	Fixed (dBW)	Mobile (dBW)
928 to 929	5.0		+17	
932 to 932.5			+17	
932.5 to 935	20.0		+40	
941 to 941.5			+30	
941.5 to 944	20.0		+40	
952 to 960	20.0		+40	
1,850 to 1,990	20.0		+45	
2,130 to 2,150	20.0		+45	
2,150 to 2,160	20.0		+45	
2,180 to 2,200	20.0		+45	
2,450 to 2,500	20.0		+45	
2,500 to 2,686	10.0		+45	
2,686 to 2,690	0.25		+45	
6,425 to 6,525		20.0		+35
6,525 to 6,875	20.0		+50	
10,550 to 10,565	10.0		+40	
10,565 to 10,615	(6)			
10,615 to 10,630	10.0		+40	
10,630 to 10,680	(6)			
12,200 to 12,700	10.0		+50	

12,700 to 13,250	10.0		+50
17,700 to 18,600	10.0		+55
18,600 to 18,800	10.0		+35
18,800 to 19,700	10.0		+55
21,200 to 23,600	10.0		+40
31,000 to 31,300	0.05	0.05	
38,600 to 40,000	10.0		+40

4.10.2 Proposed Commission Rule Changes

94.73 Power limitations.

(a) On any authorized frequency, the average power delivered to an antenna in this service shall be the minimum amount of power necessary to carry out the communications desired. Application of this principle shall include, but not be limited to, requiring a licensee who replaces one or more of his antennas with larger antennas to reduce his antenna input power by an amount appropriate to compensate for the increased primary lobe gain of the replacement antenna(s). In no event shall the average equivalent isotropically radiated power (EIRP), as referenced to an isotropic radiator, exceed the values specified below. Further, the output power of a transmitter on any authorized frequency in this service shall not exceed the following.

Frequency band (MHz)	Maximum allowable transmitter power		Maximum allowable EIRP	
	Fixed (W)	Mobile (W)	Fixed (dBW)	Mobile (dBW)
928 to 929	5.0		+17	
932 to 932.5			+17	
932.5 to 935	20.0		+40	
941 to 941.5			+30	
941.5 to 944	20.0		+40	
952 to 960	20.0		+40	
1,850 to 1,990	20.0		+45	
2,130 to 2,150	20.0		+45	
2,150 to 2,160	20.0		+45	
2,180 to 2,200	20.0		+45	
2,450 to 2,500	20.0		+45	
2,500 to 2,686	10.0		+45	
2,686 to 2,690	0.25		+45	
3,600 to 3,700	*20.0*		*+50*	
3,700 to 4,200	*20.0*		*+50*	
5.925 to 6,425	*20.0*		*+50*	
6,425 to 6,525		20.0		+35

6,525 to 6,875	20.0		+50
10,550 to 10,680[9]	*10.0*		*+50*
10,565 to 10,615	(6)		
10,630 to 10,680	(6)		
10,700 to 11,700	*10.0*		*+50*
12,200 to 12,700	10.0		+50
12,700 to 13,250	10.0		+50
17,700 to 18,600	10.0		+55
18,600 to 18,800	10.0		+35
18,800 to 19,700	10.0		+55
21,200 to 23,600	10.0		+40
31,000 to 31,300	0.05	0.05	
38,600 to 40,000	10.0		+40

[9] *For point to point microwave.*

4.11 Automatic transmit power control

Automatic transmit power control (ATPC) is a relatively new technique originally implemented by AT&T and now adopted by most other microwave vendors. It solves frequency coordination problems while maintaining path availability provided by adequate fade margin. ATPC allows the microwave radio transmitter to operate in a reduced power mode (typically 10 to 20 dB below normal) until higher power is required due to occasional path fading. The reduced power mode of operation reduces the power consumption and heat dissipation of power amplifiers, thereby lowering operating costs and improving reliability.

Since the transmit power on a radio path is reduced by the amount of ATPC, the interference level into other systems is reduced accordingly. When the downstream receiver detects a faded receive signal level, ATPC increases transmit power up to full power until the fade condition clears. The time of a deep fade event requiring increase in transmit power is very small (typically on the order of a few minutes a year). Several years of industry experience with this type of system in the Part 21 frequency bands have shown that the increased interference to other systems for this short period of time is of no practical significance. Even at the higher transmit power, there is no impact unless the other system is in a simultaneous fade. This is quite unlikely due to the low probability of simultaneous fades on separate paths.

ATPC is permitted pursuant to Part 21. It has proven its worth in the Part 21 bands. Currently it is not allowed[6] in the Part 94 bands. To maximize spectral efficiency and to ensure uniform operation among all users, it is proposed that Part 94 be changed to allow automatic transmit power control. Note that ATPC does meet 94.73(a) which states that "... the average power delivered to the antenna shall be the minimum amount of power necessary to carry out the communications desired."

4.11.1 Current Commission Rules

94.45 Changes in authorized station requiring modification.

(10) Any *change* in authorized effective radiated power in excess of 3dB (a 2 to 1 ratio);

Proposed Commission Rule Changes

94.45 Changes in authorized station requiring modification.

(10) Any *increase* in authorized effective radiated power in excess of 3dB (a 2 to 1 ratio);

5.0 ANS' proposed channelization plan

5.1 ANS' channelization plan is spectrally efficient.

Currently the 2 GHz, upper 6 GHz, and 10 GHz bands are the only bands with low capacity frequency channelizations. These channelizations are necessary to implement several simultaneous systems. To allow low density users to migrate directly to the wide frequency allocation high capacity channelizations of lower 6 GHz and 11 GHz would be a disservice to low and high density users alike. Using the high density channels for low density traffic quickly would block high density growth. Few low density users could be accommodated. The example system illustrates the need for both types of channelization. The proposed channelization provides for several low density channels but protects the high density channels for appropriate utilization.

5.2 Channelization plans

A summary of the current and proposed channelization plans for the 2, 3.6, 4, and 6 GHz bands is depicted in Table 8.

TABLE 8

AVAILABLE SPECTRUM IN EACH FREQUENCY BAND (IN MHz)

	COMMON CARRIER		PRIVATE SERVICE	
	current	proposed	current	proposed
2 GHz	40	0	80	0
3.6 GHz	0	100 (*)	0	100 (*)
4 GHz	500	500 (*)	0	500 (*)
L6 GHz	500	500 (*)	0	500 (*)
U6 GHz	0	350 (*)	350	350 (*)
Total	1040	1450 (*)	430	1450 (*)

Note (*) - Shared by common carrier and private services

The above Table 8 shows the total bandwidth available to the

common carrier and private services in each frequency band. The frequency band allocation for each service can increase even after that service loses its 2 GHz allocation by sharing frequencies with the other service.

The loss of 2 GHz low and medium capacity allocations places greater urgency on the development of compensating channel allocations in the higher bands. Table 9 depicts the placement of these proposed allocations.

TABLE 9

PROPOSED CHANNEL BANDWIDTH ALLOCATIONS

Frequency Band (GHz)	Channel Bandwidth (MHz)						
	30	20	10	5	1.6	0.8	0.4
3.6 GHz			X	X	X	X	X
4 GHz		X	X	X	X	X	X
Lower 6 GHz	X		X	X	X	X	X
Upper 6 GHz			X	X	X	X	X
10.5 GHz				X	X	X	X
11 GHz	X		X	X	X	X	X

A detailed analysis of the spectrum utilization for different RF channel bandwidths is depicted in Table 10.

TABLE 10

SPECTRUM UTILIZATION BY CHANNEL BANDWIDTH (IN MHz)

	LOW CAPACITY (400/800 KHz)		MEDIUM CAPACITY (1.6 to 5 MHz)		HIGH CAPACITY (10 to 30 MHz)	
	current	proposed	current	proposed	current	proposed
2 GHz private	40	0	50	0	140	0
U6 GHz	10	10	155	155	180	180
2 GHz cc	O	0	40	0	0	0
4 GHz	0	20	0	60	500	420
L6 GHz	0	20	0	125	480	360
3.6 GHz n/a	0	10	0	50	0	100
Total private	50	-	205	-	320	-
Total cc	O	-	40	-	980	-
Total shared	n/a	60	n/a	390	n/a	1060

Note: This chart is designed to illustrate the rationale for the proposed channelization. Each bandwidth capacity must be treated independently. Due to significant channel overlap, direct comparison between the various capacity channels is inappropriate.

Some of these frequency bands have overlapping channel assignments for low, medium, and high capacity systems (i.e., 5 MHz medium capacity and 10 MHz high capacity channels in the 2 GHz private band). As a result, some spectrum is included in several different categories.

Currently, the 4 and 6 GHz common carrier bands are used exclusively for high capacity traffic. The upper 6 GHz private band is used primarily for medium capacity in a 5 MHz bandwidth and high capacity in a 10 MHz bandwidth. There are also some low capacity channels at the band edges of the upper 6 GHz band which are seldom used since they overlap one of the 5 MHz channels and must be coordinated with the adjacent broadcast band.

Traffic in the 2 GHz band includes low, medium, and only a single DS3 high capacity systems. Under current Commission rules, it

theoretically would be possible to relocate the medium capacity 2 GHz traffic into the upper 6 GHz band and the high capacity traffic into any of the three primary relocation bands. However, the private service would be losing 24 pairs of low capacity channels. The five pairs available at upper 6 GHz would be entirely inadequate. Adoption of ANS' plan would eliminate the potential that displaced 2 GHz low and medium capacity users would not have adequate spectrum in the new bands. Using this proposed channelization plan, the resulting overall spectrum distribution for low, medium, and high capacity traffic is close to the original allocation.

5.3 Necessary rule changes

5.3.1 Need for new channelizations

Systems with digital capacities of less than 7 DSl's currently are not allowed in the 4 and 6 GHz common carrier bands under Section 21.710 of the Commission's Rules, which sets a minimum system loading of 900 voice channels within 5 years or a minimum original data loading of 10 megabits per second. A change in this rule, as proposed in paragraph 4.2 herein, would be required to allow lower capacity systems into these bands.

The private service also would be losing 6 pairs of high capacity and 5 pairs of medium capacity frequencies. A permanent allocation of frequencies would be required to accommodate new private systems not related to the 2 GHz relocation. ANS' proposed reallocation of the bands above 3 GHz, detailed in Section 3.0 herein, addresses this need.

In its study, OET notes that the 2 GHz common carrier band has been experiencing very rapid growth. This band is used primarily by cellular providers to connect remote cell sites to the switched network. Under the Commission's plan, the common carriers would be losing 6 pairs of medium capacity frequencies and would need at least this many at the 4 or lower 6 GHz bands to handle 2 GHz relocations and future growth. However, satisfying these needs would require overlapping high capacity and lower capacity systems in these bands.

There is great concern among common carriers and frequency

planners that, if lower capacity systems are allowed into these bands on an unplanned basis, they will fragment the spectrum and make it difficult to coordinate high capacity radios. Fragmentation is already a problem in some areas because the Commission has not specified a frequency channelization plan for the 4, 6, or 11 GHz common carrier bands. Conflicting channel plans have resulted in less efficient usage of the spectrum. If lower capacity systems are to be allowed into these bands, it is important to define a channelization plan that will protect current and future high capacity users and promote efficient use of the spectrum. ANS' proposed channelization plan achieves this goal.

Although 11 GHz is not one of the primary relocation bands, it is recommended that a channel plan be adopted for this band as well. The main application of the 11 GHz band is in urban areas where congestion has blocked all available 4 or 6 GHz frequencies. A defined channel plan will prevent future frequency congestion, particularly on systems using less than the full 40 MHz channel bandwidth.

5.3.2 ANS' plan is consistent with industry changes

In designing these channel plans, the changing nature of the industry should be taken into account. In the past, common carriers made extensive use of long haul systems using full blocks of 4 and 6 GHz frequencies. With the proliferation of fiber optic systems, few multichannel radio systems are being built. Most new systems in the 4 and 6 GHz bands use a single pair of frequencies and many are installed for 1 or 2 DS3 capacity.

Current microwave operators are demanding very flexible radios that can be upgraded as service requirements change. For high capacity systems, radios typically are installed for 1 DS3 initially and converted to 2 or 3 DS3's as traffic grows. This flexibility is also required in medium capacity systems where radios typically are designed for 4, 8, or 12 DSl's.

In addition, rural telephone providers and private users have a need for low capacity radio systems of 1 or 2 DSl's to extend digital loop carrier systems over rough terrain. Cellular providers also need low capacity radios to connect remote cell sites in Rural Service Areas (RSAs).

As common carriers have increasing needs for medium and low capacity radio systems, private operators have new requirements for high capacity systems. Radio manufacturers have seen increasing requests for systems with more than 1 DS3 capacity to carry FDDI[7] high speed LAN traffic and digitized video between buildings in private networks. As SONET,[8] HDTV, and other wideband services are deployed, there will be increasing requirements to carry this traffic over radio where fiber optic transmission is unavailable or prohibitively expensive.

Using current technology, radios generally require at least 10 MHz of bandwidth for each 1 DS3 of capacity. The maximum available bandwidth for private operators is currently 10 MHz for frequency bands below 10 GHz. This makes it impossible to provide for the new wideband services on long paths using the current frequency allocations. The frequency bands above 10 GHz are affected by rain outage, which reduces system reliability and restricts path lengths.

Along with an increasing need for higher capacity systems, private operators are experiencing increasing frequency congestion in some urban areas, like Houston. With the loss of the 2 GHz band, the private services will not have an alternative to the upper 6 GHz band for high capacity traffic in cases of frequency congestion.

As a result of these trends, the radio needs of common carriers and private operators are increasingly similar. The problems of increased frequency congestion in urban areas and the loss of the 2 GHz frequency bands are also similar. There is a precedent for this since common carriers and private operators are currently sharing the 10 and 18 GHz bands. Under these circumstances, ANS' proposal for co-primary private op-fixed and common carrier sharing of their frequency bands on a permanent basis would help solve these problems.

REFERENCES:

1. "Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies", FCC Notice of Proposed Rule Making, ET Docket No. 92-9, January 16, 1992.

2. Letter, dated April 20, 1992, from the Commissioners to Senator Ernest F. Hollings.

3. "Creating New Technology Bands for Emerging Telecommunications Technology", FCC Office of Engineering and Technology, Publication Number OET/TS 91-1.

4. Frequency study performed by Microwave Planning, Inc. of Dallas, Texas.

5. Data supplied by the Satellite Broadcasting and Communications Association based in Alexandria, Virginia, indicating over 3.5 million home satellite systems have been sold in the U.S. over the last 10 years.

6. Letter, dated January 2, 1992, from FCC, Land Mobile and Microwave Division, to Fletcher, Heald and Hildreth,

7. Fiber Distributed Data Interface (FDDI), a 100 Megabit/second high speed local area network standard (ANSI Std X3T9.5).

8. Synchronous Optical Network (SONET), a digital transmission hierarchy based on a basic signal of 51.840 Mbit/s (STS-1) and a byte interleaved multiplexing scheme that results in a family of rates and formats defined as integer multiples (STS-N) of the basic rate (ANSI Std T1.105-199() and Bellcore TA-TSY-000253).

9. Rockwell International Working Paper WP87-1012, "CCIR and USA Frequency Plans for LOS Microwave Radio Relay Systems," November 1987, G. Kizer

10. Various Alcatel Network Systems Internal Letters and Working Documents, 1991 and 1992, W. Knight and D. Guill

APPENDIX

CURRENT COMMON CARRIER FREQUENCY PLANS[9]

TABLE 7.1

4.0 GHz FREQUENCY BAND

USE
COMMON CARRIER
AB PLAN
CHANNELS 1 - 12

CENTER FREQUENCY
3950.0 MHz

BANDWIDTH
500.0 MHz

FREQUENCY ALLOCATION
3700.00 MHz TO 4200.00 MHz

CHANNEL ASSIGNMENTS

GO CHANNELS		RETURN CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
7.0A	3710.0000	7.0B	3750.0000
1.0A	3730.0000	1.0B	3770.0000
8.0A	3790.0000	8.0B	3830.0000
2.0A	3810.0000	2.0B	3850.0000
9.0A	3870.0000	9.0B	3910.0000
3.0A	3890.0000	3.0B	3930.0000
10.0A	3950.0000	10.0B	3990.0000
4.0A	3970.0000	4.0B	4010.0000
11.0A	4030.0000	11.0B	4070.0000
5.0A	4050.0000	5.0B	4090.0000
12.0A	4110.0000	12.0B	4150.0000
6.0A	4130.0000	6.0B	4170.0000

CHANNEL BANDWIDTH
20.00 MHz (ALL CHANNELS)

GUARD BANDS
LOWER - 0.0000 MHz
UPPER - 20.0000 MHz

T/R PAIRS TOTAL
12

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: Auxiliary channels are available at 4190 MHz (13A) go and 4198 MHz (13B) return. Channel pairs 1 through 6 are Group One; channel pairs 7 through 12 are Group Two. Group One and Group Two have orthogonal polarizations.

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TABLE 8.1

6.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
REGULAR T PLAN

CENTER FREQUENCY
6175.0 MHz

BANDWIDTH
500.0 MHz

FREQUENCY ALLOCATION
5925.00 MHz TO 6425.00 MHz

CHANNEL ASSIGNMENTS

GO (L) CHANNELS		RETURN (H) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
11.0T	5945.2000	21.0T	6197.2400
12.0T	5974.8500	22.0T	6226.8900
13.0T	6004.5000	23.0T	6256.5400
14.0T	6034.1500	24.0T	6286.1900
15.0T	6063.8000	25.0T	6315.8400
16.0T	6093.4500	26.0T	6345.4900
17.0T	6123.1000	27.0T	6375.1400
18.0T	6152.7500	28.0T	6404.7900

CHANNEL BANDWIDTH
29.65 MHz (ALL CHANNELS)

GUARD BANDS
LOWER - 5.3750 MHz
CENTER - 14.8400 MHz
UPPER - 5.3850 MHz

T/R PAIRS TOTAL
8

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: Auxiliary channels are available at 5925.5000 MHz (10T) go, 6172.5000 MHz (19T) go, and 6177.5000 MHz (20T) return, 6424.5000 MHz (29T) return.

TABLE 8.2

6.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
STAGGERED S PLAN

CENTER FREQUENCY
6175.0 MHz

BANDWIDTH
500.0 MHz

FREQUENCY ALLOCATION
5925.00 MHz TO 6425.00 MHz

CHANNEL ASSIGNMENTS

GO (L) CHANNELS		RETURN (H) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
10.0S	5930.3750	20.0S	6182.4150
11.0S X	5960.0250	21.0S *	6212.0650
12.0S *	5989.6750	22.0S X	6241.7150
13.0S X	6019.3250	23.0S *	6271.3650
14.0S *	6048.9750	24.0S X	6301.0150
15.0S X	6078.6250	25.0S *	6330.6650
16.0S *	6108.2750	26.0S X	6360.3150
17.0S X	6137.9250	27.0S *	6389.9650
18.0S	6167.5750	28.0S	6419.6150

CHANNEL BANDWIDTH
29.65 MHz (ALL CHANNELS EXCEPT 10.0S, 18.0S, 20.0S, 28.0S)
10.75 MHz (CHANNEL 10.0S)
14.84 MHz (CHANNEL 18.0S, 20.0S)
10.77 MHz (CHANNEL 28.0S)

GUARD BANDS
LOWER - 0.0000 MHz
CENTER - 0.0000 MHz
UPPER - 0.0000 MHz

T/R PAIRS TOTAL
9

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: This is a short haul plan. A typical application is to use the "*" frequencies on one path and the "x" frequencies on the next.

TABLE 8.3

6.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
SPLIT C PLAN

CENTER FREQUENCY
6175.0 MHz

BANDWIDTH
500.0 MHz

FREQUENCY ALLOCATION
5925.00 MHz TO 6425.00 MHz

CHANNEL ASSIGNMENTS

GO (L) CHANNELS		RETURN (H) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
11.0A	5937.7875	21.0A	6189.8275
12.0A	5967.4375	22.0A	6219.4775
13.0A	5997.0875	23.0A	6249.1275
14.0A	6026.7375	24.0A	6278.7775
15.0A	6056.3875	25.0A	6308.4275
16.0A	6086.0375	26.0A	6338.0775
17.0A	6115.6875	27.0A	6367.7275
18.0A	6145.3375	28.0A	6397.3775

CHANNEL BANDWIDTH
29.65 MHz (ALL CHANNELS EXCEPT 11.0A)
25.575 MHz (CHANNEL 11.0A)

GUARD BANDS
LOWER - 0.0000 MHz
CENTER - 14.8400 MHz
UPPER - 12.7975 MHz

T/R PAIRS TOTAL
8

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: This a short haul plan. A typical application is to use the "split C" plan on one path and the "split U" plan on the next.

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TABLE 8.4

6.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
SPLIT U PLAN

CENTER FREQUENCY
6175.0 MHz

BANDWIDTH
500.0 MHz

FREQUENCY ALLOCATION
5925.00 MHz TO 6425.00 MHz

CHANNEL ASSIGNMENTS

GO (L) CHANNELS		RETURN (H) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
11.0B	5952.6125	21.0B	6204.6525
12.0B	5982.2625	22.0B	6234.3025
13.0B	6011.9125	23.0B	6263.9525
14.0B	6041.5625	24.0B	6293.6025
15.0B	6071.2125	25.0B	6323.2525
16.0B	6100.8625	26.0B	6352.9025
17.0B	6130.5125	27.0B	6382.5525
18.0B	6160.1625	28.0B	6412.2025

CHANNEL BANDWIDTH
29.65 MHz (ALL CHANNELS EXCEPT 28.0B)
25.595 MHz (CHANNEL 28.0B)

GUARD BANDS
LOWER - 12.7875 MHz
CENTER - 14.8400 MHz
UPPER - 0.0000 MHz

T/R PAIRS TOTAL
8

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: This is a short haul plan. A typical application is to use the "split C" plan on the next.

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TABLE 12.1
11.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
REGULAR (MAIN) PJ PLAN

CENTER FREQUENCY
11200.0 MHz

BANDWIDTH
1000.0 MHz

FREQUENCY ALLOCATION
10700.00 MHz TO 11700.00 MHz

CHANNEL ASSIGNMENTS

GO (P) CHANNELS		RETURN (J) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
4.0A	10715.0000	9.0B	11245.0000
1.0A	10755.0000	12.0B	11285.0000
10.0A	10795.0000	5.0B	11325.0000
11.0A	10835.0000	8.0B	11365.0000
6.0A	10875.0000	1.0B	11405.0000
7.0A	10915.0000	4.0B	11445.0000
2.0A	10955.0000	11.0B	11485.0000
3.0A	10995.0000	10.0B	11525.0000
12.0A	11035.0000	7.0B	11565.0000
9.0A	11075.0000	6.0B	11605.0000
8.0A	11115.0000	3.0B	11645.0000
5.0A	11155.0000	2.0B	11685.0000

CHANNEL BANDWIDTH
40.00 MHz (ALL CHANNELS EXCEPT 4.0A, 2.0B)
30.00 MHz (CHANNEL 4.0A)
30.00 MHz (CHANNEL 2.0B)

GUARD BANDS
LOWER - 0.0000 MHz
CENTER - 50.0000 MHz
UPPER - 0.0000 MHz

T/R PAIRS TOTAL
12

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: Typically channels 2.0B and 4.0A are used for narrowband transmission only. The above is the two frequency plan. If a four frequency is required for low density application, every other consecutive channnel is used on one path and the other channels are used on the next path.

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CLEARED FOR RELEASE OUTSIDE COMPANY

APPROVED_____ DATE_____

TABLE 12.2

11.2 GHz FREQUENCY BAND

USE
COMMON CARRIER
ALTERNATE (INTERLEAVED) ED PLAN

CENTER FREQUENCY
11200.0 MHz

BANDWIDTH
1000.0 MHz

FREQUENCY ALLOCATION
10700.00 MHz TO 11700.00 MHz

CHANNEL ASSIGNMENTS

GO (E) CHANNELS		RETURN (D) CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
4.0C	10735.0000	9.0D	11225.0000
1.0C	10775.0000	12.0D	11265.0000
10.0C	10815.0000	5.0D	11305.0000
11.0C	10855.0000	8.0D	11345.0000
6.0C	10895.0000	1.0D	11385.0000
7.0C	10935.0000	4.0D	11425.0000
2.0C	10975.0000	11.0D	11465.0000
3.0C	11015.0000	10.0D	11505.0000
12.0C	11055.0000	7.0D	11545.0000
9.0C	11095.0000	6.0D	11585.0000
8.0C	11135.0000	3.0D	11625.0000
5.0C	11175.0000	2.0D	11665.0000

CHANNEL BANDWIDTH
40.00 MHz (ALL CHANNELS)

GUARD BANDS
LOWER - 15.0000 MHz
CENTER - 10.0000 MHz
UPPER - 15.0000 MHz

T/R PAIRS TOTAL
12

SOURCE
FCC RULES AND REGULATIONS PART 21.701
AND OTHER SOURCES

NOTE: Typically, channels 5.0C and 9.0D are used for narrow band transmission only. The above is a two frequency plan. If a four frequency plan is required for low density application, then every other consecutive channel is used on one path (six duplex channels) and the other channels (six duplex channels) are used on the next path.

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074-5006-001 (4-78)

PROPOSED FREQUENCY PLANS[10]

3.6 GHz CHANNEL PAIRS

10 MHz PREFERRED CHANNELS

GO CHANNELS		RETURN CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
1	3605	1'	3655
2	3615	2'	3665
3	3625	3'	3675
4	3635	4'	3685

50 MHz TRANSMITTER TO RECEIVER SPACING

3.6 GHz CHANNEL PAIRS

5 MHz PREFERRED CHANNELS

GO CHANNELS		RETURN CHANNELS	
CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)	CHANNEL DESIGNATION	CHANNEL CENTER FREQUENCY(MHz)
1	3602.5	1'	3652.5
2	3607.5	2'	3657.5
3	3612.5	3'	3662.5
4	3617.5	4'	3667.5
5	3622.5	5'	3672.5
6	3627.5	6'	3677.5
7	3632.5	7'	3682.5
8	3637.5	8'	3687.5

50 MHz TRANSMITTER TO RECEIVER SPACING